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Brillouin Light Scattering study of patterned TiN/SiOC:H/Si structures JONATHAN ZIZKA, The Ohio State University, SEAN KING, Intel Corporation, ANDY ANTONELLI, Antonelli Research and Technology LLC, R. SOORYAKUMAR, The Ohio State University — In order to improve device performance of interconnects, the microelectronics industry utilizes low-k dielectric technology in place of traditional SiO_2. Furthermore, titanium nitride (TiN) is being widely used as a hard mask to pattern low k materials such as SiOC:H into desired architectures with <100 nm length scales. However, the high stress and stiffness of the TiN over-layer may adversely influence the delicate underlying patterns and affect device performance. In this study we utilize Brillouin light scattering (BLS) to probe the elastic properties of TiN/SiOC:H structures grown on Si that have been patterned into a series of parallel wires of rectangular cross-sections with sub 200 nm pitch and depths. In studying the influence of the hard mask on the mechanical properties of SiOC:H, BLS offers a non-invasive approach to detect acoustic excitations and to measure their mode dispersions for incident light with wave-vector components parallel or perpendicular to the TiN wires. The results of measurements performed on samples with a range of wire dimensions (width/depth) will be presented that include the dependence of the Brillouin peak intensities on the incident and scattered light polarization as well as a model of the mode profiles.

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